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ABSTRACT

Memory work has potential usefulness as a method of helping students explore their relationship to science. Students have multiple early experiences with the natural world, but often these experiences are divorced from their school-based learning. It is known, however, that students use their informal experiences of the natural world in their construction of scientific concepts. A potentially significant consequence of the use of memory work as a curriculum strategy for students is their recognition that they weave their own understanding into their knowledge construction. This recognition can be empowering for self-directed, motivated scientific exploration and learning. Five women social and life scientists came together with the intent of exploring memory work as theory and method. Since January of 1994 they met twice a month and each session was audio-recorded and transcribed. They focused on how they constructed their relationship to math and science beginning with science as a content area. Findings of their memory work are organized by content, process, and potential applications. (MLV)

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THINKING ABOUT SCIENCE THROUGH MEMORY WORK

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THINKING ABOUT SCIENCE THROUGH MEMORY WORK

OBJECTIVES

The purpose of this paper is to examine the potential usefulness of memory-work as a method of helping students explore their relationship to science. Students have multiple early experiences with the natural world, but often these experiences are divorced from their school-based learning. Yet we know that students use their informal experiences of the natural world in their construction of scientific concepts (Driver, 1985). A potentially significant consequence of the use of memory-work as a curriculum strategy for students is their recognition that they weave their own understanding into their knowledge constructions. This recognition can be empowering for self-directed, motivated scientific exploration and learning.

BACKGROUND

Memory-work is a feminist method developed by Frigga Haug (1987) to study how we construct ourselves into existing social relations. It is a method rooted in consciousness raising, but goes a step further through collectively theorizing about the stories we weave out of our memories. It is based on the idea that individual experience is a legitimate source of knowledge. Haug (1987) describes her collective research and states:

> We set out to investigate, then, the processes through which we have formed ourselves as personalities, rather than the way things "really" - objectively - were. We therefore focused our attention on the way individuals continuously reproduce society as a whole: the way they enter into pre-given structures, within which they produce both themselves, and the categories of society. (p. 40)

The ultimate aim of this method is a sense of awareness that affords an opportunity for change: awareness of the "givens" of the social world, and awareness of tacit arrangements and social circumstances that are said to be "natural" or "determined." Through collective theorizing about our personal histories and individual memories, we live a more conscious life and come to understand the roots of our current lives. With this understanding a door is opened for change.

The work that stimulated the formation of our group and the present work came out of a memory-work collective in Australia. Crawford, Kippax, Onyx, Gault, and Benton (1992) explored their memories of particular emotions in order to understand the relation of gender to the ways in which they constructed their emotional lives. Our work explored our relationship to science through our memories of natural elements.

METHOD

Five women social and life scientists came together with the intent of exploring memory-work as theory and method. We met twice a month since January of 1994. Each session was audio-recorded and transcribed.

The group chose to focus on how we have constructed our relationship to mathematics and science. We began with science as a content area. Our early memories of the natural elements: air, water, earth, and fire were explored. Later, we added trees and expanded our work to include adolescent and adult memories. Our methodology was modeled after the three phases of memory work described by Crawford et al. (1992). In the first phase, we independently wrote our earliest memory triggered by an element, for example, fire. The memory was written in the third person with as much detail as possible and with no

interpretation or explanation. In the second phase, each read her memories to the group. Waiting until all memories are read, we then considered initial impressions and observations, and differences and commonalties among the memories read. We also looked for cliches, contradictions, and popular conceptions. We examined what is missing from the memories. In the third phase we began to theorize about the memories stimulated by a number of different triggers (those written in response to air, earth, water and fire). We considered both established theory and the theory we generated collectively.

After working with our earliest memories of the natural elements of earth, air, fire, and water, we became curious about our memory of other natural things and at different ages or times of our lives. Trees were used as a trigger for further early memories, then all five triggers were used for adolescent memories and memories of early adulthood. The theorizing continues as the memories and transcripts are reviewed, compared and collectively discussed.

FINDINGS

The findings from our memory work are organized by content, process and potential applications. Table 1 presents a short description of each of the stories recollected from our earliest memory, adolescence, and young adulthood.

Table 1

Memories

Childhood Memories

	Adrienne	Diane	Judy	Margaret	Patti
Fire 3/3/94		can-can	matches	candle flame; brother's cigarette & balloon	floor furnace
Water 3/3/94		sauna & grandma	club pool	gutter water; fairy rock	stream dams
Air 4/21/94	up in air	Mae and Dad breathing	arm through the air	swing; thunder storm; bronchitis	swimming pool laps; cave
Earth 5/5/94	sandbox	lake muck	graveyard	digging hole; dirt sifting	eating vegetables
Tree 5/25/94	seeds growing	willow flute	tree house	willow tree; dead snake; carriage; empty lots	red sugar maple; calf

Adolescent Memories

	Adrienne	Diane	Judy	Margaret	Patti
Fire 8/30/94	campfire	magnesium	matchless fire; bunsen burner	bunsen burner; fire alone	campfire box
Water 9/13/94	bikini	skiing	WSI	lab carrot; canoing	watermelon
Air 27/94	fair smoking	blanket	tower picture	soft coal; poem; asthma; clarinet	tornado
Earth 11/1/94 11/12/94	ivy	motorcycle garden	garden boulders	farm kiss	chat hole
Tree 11/1/94	dirty leaves	Jr. Prom	treeless, glass	arboretum	car tree

Young Adult Memories

	Adrienne	Diane	Judy	Margaret	Patti
Fire 11/2/94	fireplace flu	naboom wood	candlelight vigil	Halloween baby	family fire
Water 11/2/94	flooding	head ache	San Fran bay	pond wading; quarry pond	glaciers
Air 11/30/94	balloons	leaving, snow	dunes ranger	flying	warm air droplets
Earth 12/14/94	catprints	poor potatoes	earthquake	family planting	grape miracle
Tree 12/14/94	crooked Xmas tree	almonds	acid	beds and trees	allergies

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Content

We observed that some of our memories were amalgamated. That is, the memory did not appear to be linked to a single episode, but was an amalgamation of multiple similar episodes. We also found that our reading of each others' memories triggered memories we had been unable to access in isolation. The question of what was missing from our memories revealed that we censored some of our memories as, for example, when emotional conflicts or key family figures were absent from many of our narratives.

Major themes emerged from our preliminary understanding of the memories. The social influence of others, our own developmental processes, our emotional involvement, and our relationship to the natural world through the element continue to be complex concerns. Each of these remains important in our continuing analysis. A common seduction is to try to categorize the content of the memories. We believe that understanding the interrelationship among the themes addresses our research concerns better than merely categorizing the content of the memory.

We mapped each of the memories relative to the intersection of two themes; the social influence of others and whether or not the element was the focus of the memory. Figure 1 presents memories at different ages: earliest, teen and adult. Generally, our earliest memories were scattered across the matrix. Conversely, in our teens, the triggers engendered memories that were predominantly ways of describing our interactions and relationships with others. Our adult memories were focused on the element exploration with it and vivid descriptions of it.

When the elements were mapped individually over time (earliest, teen and adult) different patterns emerged (Figure 2). Earth memories contained a focus on others and were equally divided between a focus or lack of focus on the element. Fire memories were virtually all focused on the element itself in the presence or absence of others. The water memories were scattered through each quadrant.

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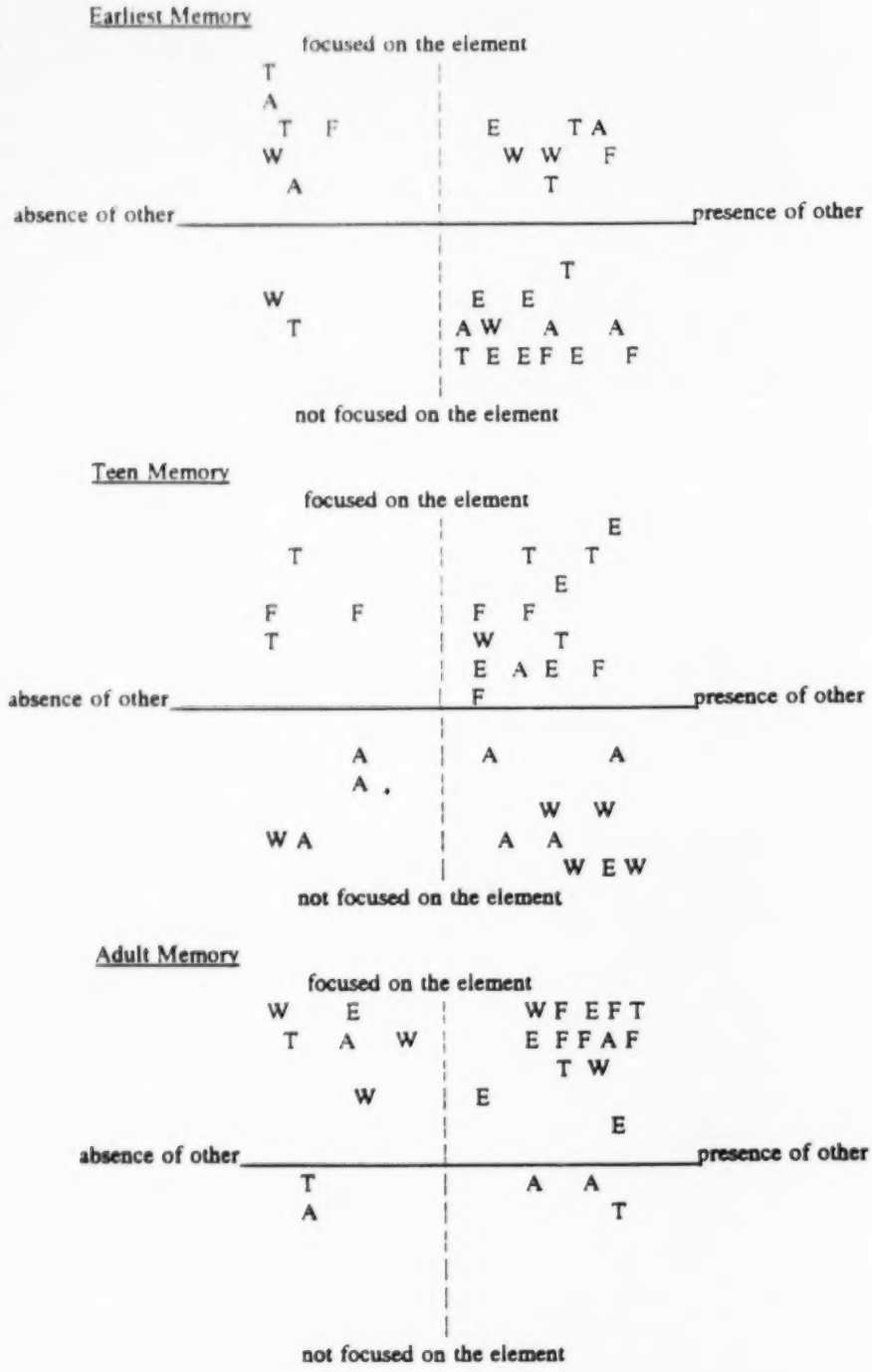


Figure 1. Memories mapped by element across age levels on "element" and "other" dimensions (A = air; E = earth; F = fire; T = tree; W = water).

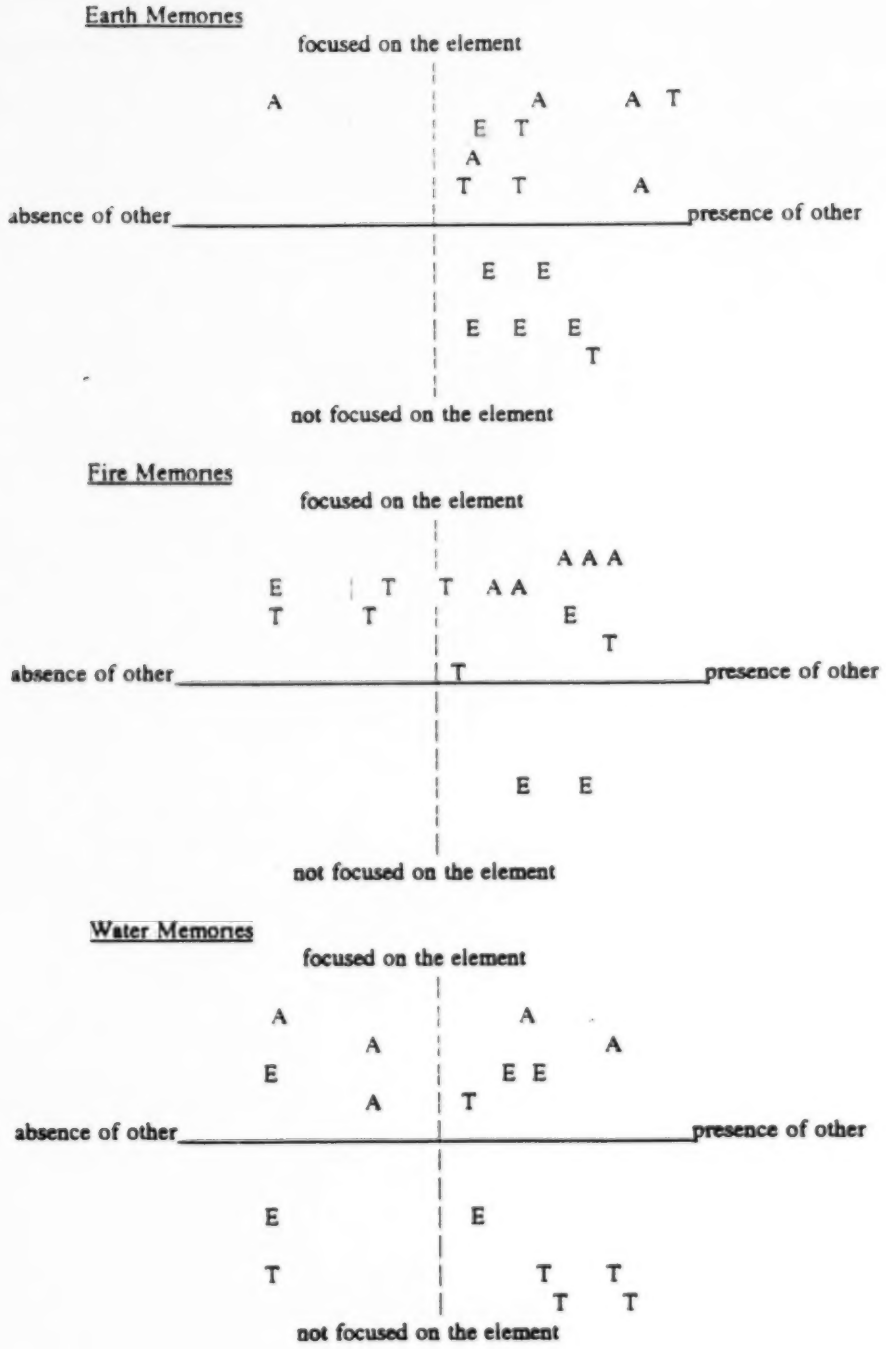
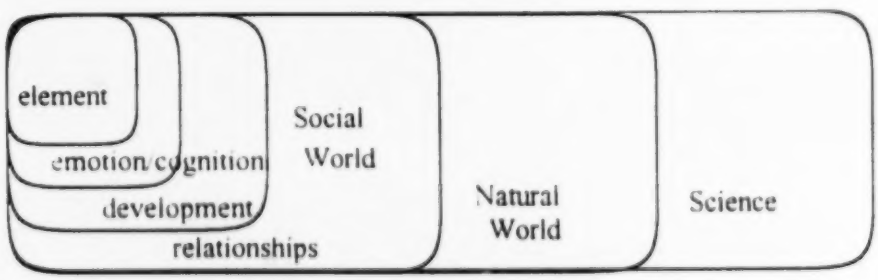


Figure 2. Memories mapped by age levels across elements on "element" and "other" dimensions (E = earliest memory; T = teen; A = adult).

Figure 3 depicts our theoretical exploration of the interrelationship of the broad themes that emerged. In general terms, the idea of a memory kernel (Haug, 1987) or a memory core describes the essential memory that is then surrounded by a history of socialization and the current process of narrating the memory. The history of socialization is revealed in some of the layers in which our memories of elements were embedded (this was referred to as sediment in Haug's work). It is important to emphasize that the layers are not ordered in any stage fashion; they merely represent themes of influence. The layers include our own emotions, such as anxiety, fear, or exhilaration; developmental concerns, such as issues of authority, exploration, competence, or competition; the interaction of other, including family, peers, real or imaginary friends; the influence of a larger world, either natural or social, and some potential relationship with the ideas of science.

Figure 2. Potential Interrelationships Among Themes.



These layers shape the telling of the memory around the element. The layers also appear to fall into developmental patterns. For example, it was noticed that as the impact of socialization in school set in, we began to develop feelings of incompetence in school relative to the element. That is, feelings of incompetence arose in relation to natural elements or

scientific concepts within the school setting at the same time that our need for peer affiliation and acceptance increased

Process

We used the same triggers to develop our memories, but the way we employed those triggers varied among us along emotional, social, cognitive, and sensory access points. For example, among our earliest memories triggered by air, some were accessed through the recall of sensations associated with the element, and others were accessed by recalling an emotion-filled moment. One memory involved a drastic change in air temperature upon entering a cave, while another involved an experience of panic and fear when hoisted into the air by parents. Such variations confronted us with the extent to which the contents of the memories have been shaped by the way in which we accessed those memories.

In addition to access, we found that the narrative process had a molding influence. Although initial guidelines were developed, we found that we censored some thoughts, used first and third person as needed, placed value on memories (positive and negative), used capitalized or bold words for emphasis, or consciously searched for memories related to exploration or experimentation (those with potential science relevance) in developing narrative.

The means of access appeared to shape the focus of the memory narrative and sometimes the core of importance (this core was referred to as the memory kernel by Haug, 1987). With our continued discussion of the memories, the distinction between the access to the memory and the memory core became less clear. Often, the core lost its importance and actually disappeared in the subsequent discussions. Thus, initially, the means of access helped to determine the core of the memory, but the focus changed over time and changed with our

collective talk about the memory. For example, months after discussing the early memories associated with fire, an observation about differences in our rural and urban experiences highlighted an early memory about spring grass burning. The original access was associated with strong feelings about the parent present in the memory; yet, others in the group created new meaning for the memory as a uniquely rural experience. Members of the group now have a different, deeper or transformed understanding of the other's memory; at the same time, the retelling and discussion of the memory has affected the meaning of the memory for the person who originally recalled the event. In this particular example, we see how the memory has been transformed from its initial core to a focus that is socially constructed through the processes of narration and collective theorizing.

We found, then, that in addition to accessing or remembering the event, telling the memory, writing the memory, narrating and talking about the memory, and our knowledge related to the memory of the element all have an impact on the memory of the experience. Now the question illuminated by the method becomes: What is the relationship of knowledge to memory? Memory as shaped by all these processes is interwoven with the knowledge of the element constructed during the experience and the time of the recalled memory. Such weaving, in fact repeated reweaving, is an important aspect of knowledge construction.

Sharing memories with each other expanded our awareness of our cultural and social differences. In our collective theorizing about our memories, our individual knowledge of the element and each other expanded. Knowledge was reconstructed as we changed what we knew about the element through the perspective of another person's memory. Recall the previous memory of rural grass burning in the spring. The collective discussion provided new

information and understanding to those group members who grew up in more urban areas. We found that the method was elaborately intertwined with the memories themselves.

Potential Applications

An extension of our experience is to introduce students to memory-work as method. This seems particularly useful in the area of science which is often reduced to an externalized body of knowledge cut off from the experience of the knower. It is our intent to explore with educators the potential usefulness of this method as a curricular tool. Recognizing that using self as subject is a radical approach to inquiry, we discovered the method illuminated the role of our own experience in shaping our construction of scientific knowledge.

The work that these ideas are based on shows us that our relationship, knowledge, or perception of body (Haug's work) and emotion (Crawford, et al.) is socialized. For students socialization reflects the impact of the dominant culture. Through memory work we begin to uncover unconscious aspects of our socialization and take command of it. We are suggesting that we need not wait until we are adults to recognize and analyze the impact of socialization. Students can begin to take control of the socialization process in their classrooms.

The use of the memory work method in the public school can potentially restore the natural process of learning in the classroom. Everyday learning becomes a part of the classroom curriculum. One possible classroom activity includes writing an early memory, collectively discussing the memory, and relating the discussion to science. Concept mapping could be a useful pedagogical tool to visually link the memories to science and track the learning that occurs over time.

Although we have used natural elements, students can be encouraged to recall any individual memories that touch on scientific concepts. If the method transfers to the

classroom. the experiences of viewing memories differently after discussion and mapping those of others will transform perceptions. open awareness and enable students to respect cultural differences. We have great hope for the use of this method as a teaching strategy.

References

Crawford, J., Kippax, S. Onyx, J., Gault, U., & Benton, P. (1992). Emotion and gender: Constructing meaning from memory. London: Sage.

Driver, R. (1985). Beyond appearances: The conservation of matter under physical and chemical transformations. In R. Driver, E. Guesne, & A. Tiberghian (Eds.) Children's ideas in science (pp. 145-167). Philadelphia: Open University Press.

Haug, F. (1992). Female sexualization: A collective work of memory. London: Verso.